2005

Manitoba's Conservation and Recovery Strategy for Boreal Woodland Caribou

(Rangifer tarandus caribou)

Protecting & Managing *our Future*

Manitoba
Building for the Future

Minister's Message

Manitoba Conservation has developed a Conservation and Recovery Strategy for Boreal Woodland Caribou (*Rangifer tarandus caribou*). It is based on scientific research, knowledge and experience gained from co-operative partnerships between individuals and groups over the past three decades. These partners are dedicated to this special species of our boreal forest.

It is important to note that people from the Opaskwayak, Mosakahikan, Chemawawin Cree Nations, Brokenhead Objibway, Grand Rapids, Hollow Water, Black River and Sagkeeng First Nations and the Cormorant Resource Management Board participated on local caribou committees in the northern and eastern regions. First Nations have a unique heritage and special relationship with boreal woodland caribou. The sharing of their experiences, viewpoints and traditional knowledge strengthened our overall understanding of caribou and will help develop a comprehensive, sound, knowledge base that will guide effective management of the species.

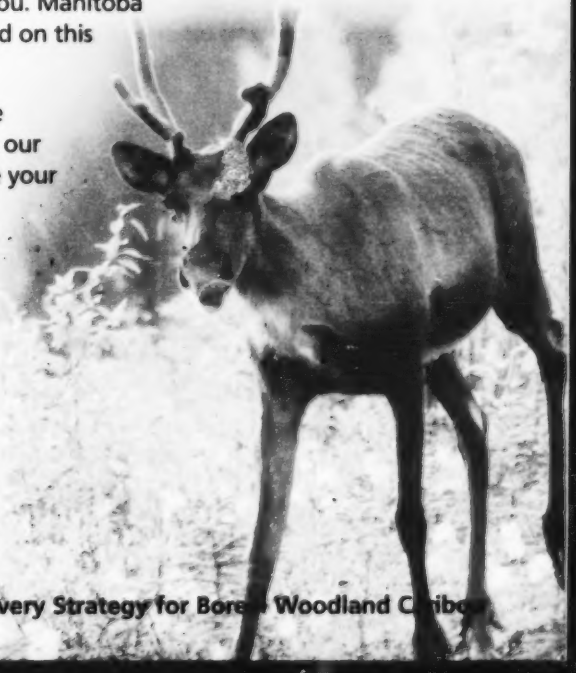
I also acknowledge the significant financial contributions of many funding agencies including the Manitoba Model Forest, Tembec Industries Inc. and Manitoba Hydro. Countless hours have been dedicated to caribou conservation initiatives over the decades by these partners, environmental and wildlife organizations, universities, members of the public and Manitoba Conservation staff.

This conservation and recovery strategy presents the Manitoba government with goals, objectives and guiding principles that will ensure effective management of habitat and management action plans that will sustain boreal woodland caribou. Manitoba Conservation staff will develop and implement such action plans based on this strategy, now, and in the years to come.

This strategy is a living document. It will change and develop with the ever-increasing knowledge base resulting from ongoing research. It is our intention to continually review and update this strategy. We welcome your comments and suggestions.

Stan Struthers

Stan Struthers,
Conservation Minister



Executive Summary

The western Canadian population of boreal woodland caribou was declared a vulnerable species by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in April 1984. The Manitoba Endangered Species Advisory Committee assessed the status of boreal woodland caribou in Manitoba in September 1994 as "endangered." The status for the species in Canada excluding all coastal populations was re-assessed in 2002 as "threatened." In 2003, boreal woodland caribou were listed as "threatened" under the federal government's *Species at Risk Act* (SARA). These assessments recognized that major threats to boreal woodland caribou are associated with habitat loss, degradation and fragmentation.

Woodland caribou were once found throughout the boreal forest of Manitoba. Their disappearance from southern parts of their historical range is attributed to many things such as:

- human activities that have resulted in habitat alteration
- possibly increased predation
- the introduction of pathogenic parasites and diseases
- uncontrolled hunting

The current population of boreal woodland caribou in Manitoba is estimated at between 1,821 and 3,135. They live on 10 identified ranges in the boreal lowlands, boreal shield ecozones and in other habitats. These ranges are subject to varying degrees of impact by human activities. For example, three ranges (Naosap, Atitaki-Berens and Owl-Flintstone) have been categorized as high risk due to ongoing or imminent development activities. On these ranges, caribou numbers could decline, thus action plans must be developed.

The development of this *Conservation and Recovery Strategy for Boreal Woodland Caribou* is essential to conserving and recovering boreal woodland caribou (where feasible) and their habitats. In addition, Manitoba is co-operating with other provinces, territories and the federal government in developing a national boreal woodland caribou recovery strategy.

Guiding Principles

- **ECOSYSTEM MANAGEMENT:** Maintaining the structure and function of the boreal forest ecosystem is essential for the long-term recovery of boreal woodland caribou and other species. The cumulative effects of all factors affecting boreal caribou, their use of habitats and their survival must be addressed.
- **THE PRECAUTIONARY PRINCIPLE:** While the best available information should guide management decisions, a lack of information or scientific uncertainty should not delay actions deemed essential to achieving caribou recovery. There is a need to err on the side of caution when dealing with caribou conservation measures since unknown factors and interaction among these may have negative impacts.
- **ADAPTIVE MANAGEMENT:** Use new information, knowledge and technologies to continually improve research programs, management and conservation practices.
- **SUSTAINABILITY:** Strive for recovery strategies such as habitat management that are sustainable over the long-term. This includes recognition that human activities will continue to occur on caribou ranges in Manitoba. Action plans evolving from this strategy will strive to ensure that the needs of both caribou and people are sustainable.
- **COMMITMENT TO CARIBOU MAINTENANCE:** All land-users on caribou ranges in Manitoba, including government departments, crown corporations and First Nations share responsibility for, and must be committed to the goals of this strategy. Commitment and action by all parties are essential to meeting the recovery goals for boreal woodland caribou in Manitoba.

Recovery Goals

- self-sustaining boreal woodland caribou populations on all existing ranges in Manitoba
- management of caribou habitat on all ranges to support and sustain populations inhabiting those ranges

Recovery Objectives

- maintain current local populations that are self-sustaining, to address declining populations and to promote recovery of local populations that are currently not self-sustaining
- maintain and increase boreal caribou habitat to ensure that sufficient habitat quality and quantity (in an appropriate spatial distribution) exists on all ranges to support self-sustaining local populations and ensure habitat is available to provide connectivity within, and between, ranges
- reduce direct threats that have an impact on the survival of boreal caribou populations where required
- increase understanding of boreal caribou ecology, threats to their habitat and subsequent survival as well as address major knowledge gaps by using all available sources of knowledge and undertaking additional research and monitoring activities as required
- increase outreach and communications with First Nations, other jurisdictions of government, non-government organizations, industry and the general public
- take steps to restore boreal woodland caribou populations to historical ranges, where feasible

These goals and objectives will be achieved by developing integrated management and recovery action plans in consultation with First Nations, other jurisdictions of government, industry and interested members of the public. Plans will be developed initially for high-risk ranges and will include population and habitat monitoring, research and communication. Plans are well underway for the Owl-Flintstone lakes range and have been started on the Atikaki-Berens, Naosap lakes.

Action plans for all high-risk ranges will be completed within four years. They will embrace the principles of adaptive management, changing as new information is acquired. For lower risk ranges, a more general conservation management action plan will apply. However, over time, action plans will be required. This recovery strategy will be reviewed and updated every five years.

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Introduction

Boreal woodland caribou (*Rangifer tarandus caribou*) in Manitoba historically ranged from the Manitoba/ Minnesota border in southeastern Manitoba north to approximately 57° north latitude (Seton, 1909; Banfield, 1961). Caribou no longer regularly occur south of the Winnipeg River in southeastern Manitoba (Hristienko, 1985). Manitoba's current estimated boreal woodland caribou population is thought to be stable and to range from 1,821 – 3,135 animals on 10 ranges and in other habitats between these identifiable ranges. This estimate does not include the coastal populations of caribou, which are referred to as the Cape Churchill and Pen Island herds. At one time it was thought that a population of boreal woodland caribou existed on what was previously referred to as the Nelson-Hayes range however, it now appears that over time this herd has amalgamated with the coastal Pen Island population and no longer exists as a discrete population. It should also be noted that there likely are other herds of caribou between some of the current identifiable ranges which Manitoba Conservation does not currently have information about – additional field work might identify these herds and ranges and result in an increase in the estimated population.

Boreal woodland caribou are a medium-sized (100-250 kg) subspecies of caribou belonging to the deer family (Cervidae) inhabiting Canada's boreal forests (Gray, 1999). The early winter coat is brown with a creamy white neck, mane and rump on mature bulls while that of cows may not be as white or remain generally brown. They are usually larger and darker than other subspecies. Males and females have antlers, although some females may have one or no antlers and both have vestigial upper canines. Their large crescent-shaped hooves provide support for walking on snow or moist peat and are used to dig through the snow for lichens and other ground forage (Kelsall, 1984).

Caribou management programs have been in place in Manitoba for many years and have been instrumental in survival of the species. The intent of these programs has been to enhance the knowledge base for the species; to generate baseline data for furthering our ability to mitigate the impacts of development; and to ensure the species remains as an integral component of Manitoba's wildlife mosaic. Input on management issues and funding from the Eastern Region Woodland Caribou Advisory Committee, the Northwest Regional Woodland Caribou Management and Research Advisory Committee, the forest industry, Manitoba Hydro and the Manitoba Model Forest has been significant.

The purpose of this Strategy is to guide the development and implementation of action plans, which will be developed for various ranges, with high concern ranges being the priority. This Strategy has been developed by a provincial recovery team from Manitoba Conservation with input from various branches and regions within the department. Additional input is welcome from other organizations and the public. There will be public consultation on the action plans as they are developed. This strategy is intended to be a living document and will be progressively refined and updated as knowledge and experience pertaining to boreal woodland caribou management is gained.

Some of the challenges to be faced with implementation of this Strategy and development of action plans are: adapting wood supply and forest management practices; access control and/or management associated with forestry, mining, tourism and recreation; routing of winter roads; alternative management regimes for moose and white-tailed deer populations; evaluating/measuring the success of action plans developed (through such things as obtaining better population and range-use data); linking with other planning initiatives on caribou ranges.

Conservation Status Assessment

The western Canadian population of boreal woodland caribou (*Rangifer tarandus caribou*) was declared a Vulnerable species in April 1984 by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (Kelsall, 1984). In September 1994, The Manitoba Endangered Species Advisory Committee, assessed the status of the boreal woodland caribou in Manitoba as Endangered. In May 200ᴄ, the status of boreal woodland caribou in Canada, excluding all coastal populations, was re-assessed as Threatened by COSEWIC (COSEWIC, 2002). In 2003, boreal woodland caribou were listed as Threatened under the Federal Governments *Species At Risk Act* (SARA).

These assessments all concluded that major threats to boreal woodland caribou were habitat loss, degradation and fragmentation. Further, as boreal woodland caribou are uniquely adapted to old-growth forest habitats (Darby et al. 1989), they are considered to be an indicator species that reflects the quality and health of the ecosystems they inhabit.

The Conservation and Recovery Strategy found herein recognizes boreal woodland caribou as a species of concern and recommends a framework for the conservation of this species and its habitat in Manitoba.

Habitat Requirements

Boreal woodland caribou have distinct habitat requirements at different spatial and temporal scales (Rettie and Messier, 2000). Large areas embody coarser scales (e.g., landscape level) and extended time frames (i.e., seasons) whereas finer scales embody small areas (e.g., forest patches) and narrow time frames (i.e., days/weeks). Such habitat selections enable them to avoid predation (which is the primary threat) at coarser scales, while at the finer scales seeking habitats that allow them to meet forage requirements (Bergerud, 1988; Stuart-Smith et al. 1997; Bergerud, 1974; Bergerud and Mercer, 1989; Cringan, 1957). These caribou depend upon mature forests (60-80 years) for most of their seasonal range use and movements (Bergerud, 1974; Carbyn, 1968; Darby, 1978, 1979; Rettie and Messier, 1998; Shoesmith and Storey, 1977; Stardom, 1977). They also use other habitats such as frozen lakes in the winter for loafing and string bogs for foraging. They eat arboreal and terrestrial lichens, which are primarily found in mature forests, as a major source of winter food but also make use of other food sources, e.g., leaves of deciduous trees, sedges, pitcher plants, etc. during both winter and summer. As a result of these preferences, they generally inhabit lichen-rich areas of the boreal forest (Hristienko, 1985).

At the coarse scale level, large tracts of relatively undisturbed habitats are required (Rettie and Messier 2000; Brown et al. 2003). Such habitats enable them to reduce the predation risk in several ways. First, large expanses enable caribou to select habitats with few alternate prey such as moose and deer thereby minimizing chances of being preyed upon (Bergerud and Page, 1987; Seip, 1992). Alternate prey species, like white-tailed deer or moose can, on occasion, harbour parasites and diseases, which can be lethal to boreal caribou. Secondly, boreal caribou require sufficient space to spread out within the landscape thereby maintaining themselves at low densities. This strategy reduces the hunting efficiency of predators (Bergerud, 1980; Bergerud et al. 1984; Bergerud et al 1990; Stevenson et al. 1994).

Thirdly, relatively undisturbed habitats enable them to avoid linear developments, which again, increases the hunting efficiency of predators and people (James and Stuart-Smith, 2000).

Generally, woodland caribou habitat can be characterized as peat land complexes intermixed with mature to old pine, black spruce and tamarack-dominated upland (Darby and Pruitt, 1984;

Brown et al. 1986; Bradshaw et al. 1995; Stuart-Smith et al. 1997; Rettie and Messier, 1998). Regions of Manitoba contain a variety of these forest stands, which are used along with a range of other habitats.

The spatial heterogeneity of Manitoba's boreal forest generally precludes the existence of large contiguous areas of mature forests on caribou range. This necessitates the need for identifying smaller areas of suitable habitat while at the same time ensuring that connectivity is maintained between these areas, i.e., habitat fragmentation is minimized. Some site-specific habitats essential to securing the place of this subspecies in Manitoba's wildlife mosaic include those used for winter and summer foraging; calving and calf-rearing; rutting and migration corridors capable of providing thermal cover and security from predation. Currently, revisions are being made to Manitoba's woodland caribou habitat suitability index model (HSI) using contemporary forest-resource inventory and radio-telemetry data and when finalized will be a useful tool for delineating habitats and predicting impacts.

Critical habitat is defined in the federal *Species at Risk Act* (SARA) as "the habitat that is necessary for the survival or recovery of a listed species and that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species. Manitoba supports this approach and is of the opinion that it must also include habitats currently occupied by boreal woodland caribou and those that will be required in the future, given the dynamic nature of the boreal ecosystem. Critical habitats will be identified in action plans.

Threats and Opportunities

Threats to boreal woodland caribou in Manitoba are inter-related but vary in scale. Not all threats will apply to the same scale on all ranges. The essential ingredient in habitat for this species is the need for large areas of naturally functioning boreal forest with low predation rates. At the same time that threats are dealt with there may be opportunities to produce large areas of suitable habitat over the long-term by working with the forest industry in cutting and/or silvicultural activity planning.

The main threats affecting boreal woodland caribou are the result of human activities, e.g., industrial activities that result in habitat loss, degradation and fragmentation; possibly increased predation; hunting; sensory disturbance; the introduction of potentially pathogenic parasites and disease. Additional threats in the future may include those caused by global climate change, such as increased frequency and number of wildfires. Although fires, which are a natural component of the boreal forest ecosystem and play an essential role in the evolution of natural habitats, do destroy lichens and other vegetation in the short term, they are important factors in regenerating forage over protracted time scales (Dunford, 2003) at natural frequencies.

These threats are interrelated in complex ways and likely have cumulative impacts on caribou and their habitat. For example, habitat changes can increase the carrying capacity for other ungulates, e.g., moose and white-tailed deer, which may result in increased predator populations and subsequently increased predation on caribou. Roads and other linear corridors with packed winter trails and off-road vehicle trails for recreational or other uses can enhance access to caribou habitats by predators thereby facilitating predation and the spread of parasites and diseases. A more detailed assessment of threats to caribou and their interaction with habitat changes can be found in COSEWIC (2002) and Crichton et al. (2004).

Boreal woodland caribou habitat is dynamic and what is suitable habitat today may not be at some future time as the forest matures and changes. Appreciation of these dynamics, offers opportunities to work with the forest industry to cycle habitat - in other words to harvest old growth trees and begin the regeneration process. There is also an opportunity/need to examine logged areas to ascertain if and when the rejuvenating habitat over the long term will be able to function as caribou habitat.

Populations, Ranges And Distribution

Most literature on boreal woodland caribou in Manitoba refers to individual caribou herds. For example Johnson (1993) suggested there were 27 distinct herds province-wide, with an estimated population of 2,000 animals (Crichton, 1992). Subsequent investigations have shown that the population dynamics and movements of woodland caribou are complex, censusing is difficult and therefore this estimate is likely low. The current estimate is 1,821 – 3,135 animals occurring throughout the distribution of caribou habitat in Manitoba (Figure 1). This estimate by department biologists is not the product of systematically conducted surveys, thus it likely underestimates the actual population size.

Manitoba Conservation supports an adaptive, landscape-management approach to the recovery of woodland caribou that uses a habitat-based concept of caribou ranges. Ranges are defined as areas of contiguous habitat with similar characteristics that support populations of woodland caribou or may support them in the future. Currently, there are 10 identified woodland caribou ranges in Manitoba (Figure. 2). Population size and conservation concerns have been estimated for each range using the best available information (Table 1). Concern is based on habitat loss, fragmentation or degradation and other impacts that can evolve from these, as previously discussed.

FIGURE 1. **BOREAL WOODLAND CARIBOU DISTRIBUTION RANGE IN MANITOBA (JANUARY 2006)**

FIGURE 2. **BOREAL WOODLAND CARIBOU RANGES IN MANITOBA (JANUARY 2006)**

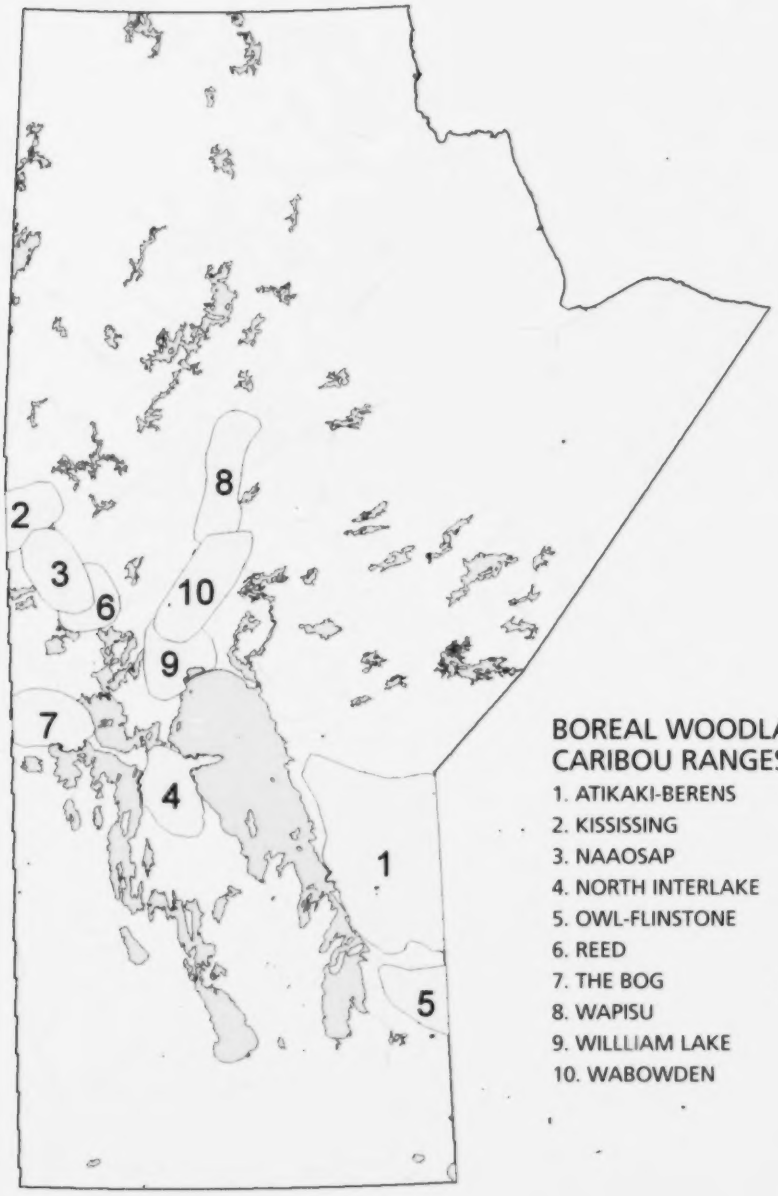

TABLE 1. CONSERVATION RISK ASSESSMENT OF BOREAL WOODLAND CARIBOU RANGES IN MANITOBA

RANGE	CONSERVATION CONCERN	POPULATION SIZE
[illegible]	High	100-200
[illegible]	High	300-500
[illegible]	High	71-85
Reed	Medium	100-150
Kississing	Medium	50-75
North Interlake	Medium	50-75
Wapisu	Medium	100-125
Wabowden	Medium	200-225
The Bog	Low	50-75
William Lake	Low	25-40

RECOVERY STRATEGY IMPLEMENTATION PRIORITIES

Recovery efforts in Manitoba will focus on those ranges identified as high conservation concern (Table 1). Of lower priority will be those ranges identified as medium and low with the intent being to eventually have action plans for all identified ranges.

MANITOBA BENCHMARKS IN THE DEVELOPMENT OF A PROVINCIAL BOREAL WOODLAND CARIBOU RECOVERY STRATEGY

- **1973** – start of radio telemetry monitoring of boreal woodland caribou in Manitoba.
- **1993** – A report on the woodland caribou outlined an action plan to conserve the species in Manitoba (Johnson, 1993).
- **1994** – A Manitoba Boreal Woodland Caribou Management Committee (BWCMC) was formed consisting of regional wildlife managers and wildlife biologists from the Wildlife Branch (now Wildlife and Ecosystem Protection Branch).
- **2000** – A draft Manitoba Woodland Caribou Management Strategy (Rebizant et al. 2000) was prepared. This strategy identified and assessed the conservation status of woodland caribou ranges, and set priorities for management and research activities for those deemed to be at high risk.
- **2003** – Manitoba participates on the National Boreal Woodland Caribou Technical Steering Committee (TSC).
- **2004/05** – Manitoba contributes to the development of a National Recovery Strategy for Boreal Woodland Caribou.
- **2003/04** – Preparation of a background document to assist with developing this recovery strategy for Manitoba (Crichton et al. 2004).
- Development of regional woodland caribou advisory committees in the Northwest and Eastern regions. Associated with these are significant partnerships that have evolved and major research initiatives and production of such reports as the new strategy for the Owl/Flinstone range.
- Development of boreal woodland caribou habitat suitability index model.
- A national boreal woodland caribou workshop and public forum was held in Manitoba in April 2005, sponsored by the Manitoba Model Forest.

TABLE 1. CONSERVATION RISK ASSESSMENT OF BOREAL WOODLAND CARIBOU RANGES IN MANITOBA

RANGE	CONSERVATION CONCERN	POPULATION SIZE
Reed	**Medium**	**100-150**
Kississing	**Medium**	**50-75**
North Interlake	**Medium**	**50-75**
Wapisu	**Medium**	**100-125**
Wabowden	**Medium**	**200-225**
The Bog	Low	50-75
William Lake	Low	25-40

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- A national boreal woodland caribou workshop and public forum was held in Manitoba in April 2005, sponsored by the Manitoba Model Forest.

Guiding Principles

The following principles were identified by the TSC and the BWCMC as important to guide the recovery of boreal woodland caribou.

Ecosystem Management: Maintaining the structure and function of the boreal forest ecosystem is essential for the long-term recovery of boreal woodland caribou and other species dependent upon it. The cumulative effects of all factors impacting boreal caribou, their use of habitats and their survival must be addressed.

The Precautionary Principle: While the best available information should guide management decisions, a lack of information or scientific uncertainty should not delay actions deemed essential to achieving caribou recovery. There is a need to err on the side of caution when dealing with caribou conservation measures since unknown factors and interaction among these may have negative impacts.

Adaptive Management: Use new information, knowledge and technologies to continually improve research, management and conservation practices (Nyberg, 1998).

Sustainability: Strive for recovery strategies such as habitat management that are sustainable over the long term. This includes recognition that human activities will continue to occur on caribou ranges in Manitoba. Action plans evolving from this Strategy will strive to ensure that the needs of both caribou and people are sustainable.

Commitment to Caribou Maintenance: All land-users on caribou range in Manitoba, including government departments, crown corporations and First Nations share responsibility for, and must be committed to the goals enunciated in this Strategy. Commitment and action by all parties are essential to meeting the recovery goals for boreal woodland caribou in Manitoba.

Recovery Goals

A. Self-sustaining boreal woodland caribou populations on all existing ranges in Manitoba.

B. Management of caribou habitat occurs on all ranges to support and sustain populations inhabiting those ranges.

Recovery Objectives

A. To maintain current local populations that are self-sustaining, to address declining populations and to promote recovery of local populations that are currently not self-sustaining.

B. To maintain and/or increase boreal caribou habitat to ensure that sufficient habitat quality and quantity (in an appropriate spatial distribution) exists on all ranges thereby supporting self-sustaining local populations and to ensure habitat is available to provide connectivity within and between ranges.

C. To reduce or mitigate direct threats that impact the survivorship of boreal caribou populations, where required.

D. To increase understanding of boreal caribou ecology, threats to their habitat and subsequent survival as well as to address major knowledge gaps by using all available sources of knowledge and undertaking additional research and monitoring activities as required.

E. To increase outreach and communications with First Nations, other jurisdictions of government, non-government organizations, industry and the general public.

F. To increase outreach and communications with First Nations, other jurisdictions of government, non government organizations, industry and the general public.

G. To undertake steps to restore boreal woodland caribou populations to historical ranges, where feasible.

Initiatives and Objectives for Recovery Action Plans

The goals and objectives will be achieved by developing integrated management and recovery actions plans in consultation with First Nations, other jurisdictions of government, industry and interested members of the public. Such plans will be developed initially for the high risk ranges and will include population and habitat monitoring, research and communication. This plan development process is well underway for the Owl-Flintstone lakes range and has been initiated on the Atikaki-Berens, Naosap Lakes and Wabowden ranges.

It is recommended that action plans be prepared for each range, with the priority being those of high conservation concern. The following represents a provincial framework for recovery action plans, recognizing that all may not be applicable to all ranges.

A. HABITAT PLANNING AND MANAGEMENT

1. **Assess the quality, quantity and spatial distribution of boreal woodland caribou habitat (Objectives B, C).**
   - i. Identify and assess the quantity, quality and spatial distribution of existing caribou habitat within high-priority ranges (including cumulative effects of existing and potential human developments and natural disturbances).
   - ii. Forecast the quantity, quality, and spatial distribution of future caribou habitat based on the anticipated cumulative effects of human developments and natural habitat change (e.g., wildfire and forest succession).
   - iii. Initiate programs to monitor the actual change in habitat quantity, quality and distribution over time.
   - iv. Identify and assess opportunities for silvicultural activities that may improve the potential for caribou habitat over the long term.
2. **Identify and delineate critical habitat for boreal woodland caribou (Objectives B, C).**
   - i. Use current technologies for identifying critical habitat within each range.
   - ii. Map existing and potential future critical habitat within each range.
   - iii. Address specific knowledge gaps required to identify critical habitat on each range.
   - iv. Map and document critical habitat for boreal woodland caribou within each range.
3. **Undertake strategic planning initiatives to provide for the long-term habitat requirements of boreal woodland caribou (Objectives B, C).**
   - i. Priority ranges for developing action plans will be those of high conservation concern.
   - ii. Develop strategic management plans for caribou ranges that manage the amount and distribution of human developments to levels concomitant with maintaining caribou on these ranges over the long term, at appropriate spatial and temporal scales (i.e., address cumulative effects).
   - iii. Identify key management initiatives that may impact caribou and their habitat (e.g., forest management plans, access management plans, and protected area management) and incorporate caribou biological requirements into these planning initiatives.
4. **Manage habitat at multiple spatial scales, to meet the habitat requirements of boreal woodland caribou (Objectives B, C).**
   - i. Where habitat (including critical habitat) is sufficient to support self-sustaining local populations, maintain existing quantity, quality and distribution on these ranges. Where habitat is insufficient, increase the quantity/quality and ensure appropriate (connectivity) distribution.
   - ii. Conduct habitat restoration (e.g., deactivation and re-forestation of roads; silvicultural activities to discourage hardwood regeneration) where required to provide

sufficient habitat quantity and quality.

iii. Ensure that the cumulative effects of natural habitat change and human developments are addressed in landscape-level management.

iv. Manage habitat between ranges, particularly where local population connectivity is vital to maintaining self-sustaining local populations and genetic diversity.

v. Incorporate short and long-term caribou habitat requirements into wildfire management.

vi. Consider expanding and/or establishing new protected areas to secure specific, valuable caribou habitat components while recognizing the dynamics of forest succession.

vii. Identify key industrial and recreational activities that will likely impact caribou and/or their habitat and develop/implement mitigative directives for these activities in consultation with interest groups.

viii. Identify and implement mitigative options and management actions to reduce the potential impacts of proposed and existing developments (e.g., linear development construction and restoration techniques).

5. **Assess the applicability of the residence concept (SARA) for boreal woodland caribou (Objective C).**

   i. Gather relevant information on habitat attributes for describing boreal caribou residences and participate in national TSC discussions.

   ii. Assess the applicability of the residence concept at the national level. If the concept applies, a formal description of residence will likely be posted on the SARA public registry and contained in the national recovery strategy for boreal woodland caribou.

   iii. Within Manitoba, determine whether sites consistent with the national concept of residence can be identified.

   iv. Delineate and protect residences within Manitoba where they can be identified.

B. POPULATION MONITORING AND MANAGEMENT

1. **Monitor boreal woodland caribou population trends (Objective A).**

   i. Participate in a national task group (made up of TSC members) to develop standardized population-monitoring and reporting procedures.

   ii. Monitor and report on range population trends, using the best available sources of information, and summarize at the provincial level.

2. **Monitor boreal caribou distribution trends (Objective A).**

   i. Delineate and refine current range areas and update with new information.

   ii. Monitor changes in range use by caribou over time.

   iii. Assess changes in range distribution by comparing current and historic distributions.

3. **Monitor boreal caribou health and condition (Objective E).**

   i. Monitor the health and body condition of individual caribou using biological samples from various sources (e.g., hunting by First Nation peoples, captures for research and translocation, highway mortalities).

   ii. Gather information on and monitor parasites and diseases (e.g., brain worm) on ranges where these threats are a concern or may become a concern.

4. **Assess the need for and, where necessary, undertake intensive boreal woodland caribou population management programs (Objectives A, B).**

   i. Assist in the development of national criteria and guidelines for conducting intensive population management programs (e.g., translocations, captive breeding) to re-establish or augment local caribou populations.

   ii. Evaluate the feasibility of intensive population management programs for ranges requiring

re-establishment or augmentation.

iii. Implement intensive population management programs where necessary, for ranges that meet criteria and guidelines.

1. **Manage direct human-caused mortality of boreal woodland caribou (Objective D).**

   i. Conservation hunting closures will be implemented where required following consultation with affected First Nations.

   ii. Assess impacts of hunting regulations for all boreal caribou ranges where other legally hunted caribou ecotypes overlap.

   iii. Reduce death and injury of boreal caribou due to vehicle collisions (e.g., through use of road de-icing agents that do not attract caribou, signage).

C. MANAGEMENT OF SENSORY DISTURBANCE AND HUMAN-CAUSED MORTALITY

2. **Manage sensory disturbance of boreal woodland caribou (Objective D).**

   i. Assess the extent, distribution and possible consequences of sensory disturbance (e.g., equipment associated with research, industrial, off-road and on-road vehicles, recreational and other activities) within caribou ranges.

   ii. Where required, take steps to reduce the displacement effects of sensory disturbance on caribou.

   iii. Monitor change in levels of displacement due to sensory disturbances over time and assess the effectiveness of initiatives to reduce sensory disturbances.

D. MANAGEMENT OF OTHER WILDLIFE SPECIES

1. **Assess and where necessary undertake predator management (Objective C).**

   i. Develop criteria for determining when predator management may be considered appropriate.

   ii. Identify areas where predator management may be necessary and explore various management options (e.g., more liberal hunting seasons, sterilization).

   iii. Undertake predator management where necessary to achieve caribou recovery where criteria (see i) are met.

2. **Manage other prey species using direct and indirect approaches (Objective C).**

   i. Manage habitat to limit human-caused range extensions of other potential prey for large predators onto caribou ranges.

   ii. Consider direct management to reduce other prey species (e.g., through more liberal hunting/trapping programs) within or adjacent to caribou range where necessary for caribou recovery. Potential effects on predator populations must be considered, monitored and managed for where necessary.

E. LEGISLATION AND POLICY

1. **Ensure that legislation/policies required for boreal woodland caribou recovery are in place (Objectives A, C, D).**

   i. Review provincial, territorial and federal (including national parks) legislation and policy relating to caribou or their habitat. Identify gaps that should be addressed to permit or enhance caribou recovery.

   ii. Revise and/or draft new legislation/policy to support protection and enhancement of boreal caribou habitat.

   iii. Revise and/or draft new legislation/policy to address other major threats to boreal caribou populations (e.g., predator management, direct human-caused mortality).

F. STEWARDSHIP AND OUTREACH

1. **Develop stewardship programs that contribute to boreal woodland caribou recovery (Objective F).**
   - i. Encourage stewardship among the general public, interest groups, crown corporations and industry.
   - ii. Develop stewardship in partnership with First Nations.
   - iii. Develop award programs to recognize the stewardship activities by industry and other stewards.
2. **Consult/communicate with the general public, interest groups, First Nations and other provinces/territories on boreal woodland caribou recovery (Objective F).**
   - i. Consult with the general public and interest groups on boreal caribou recovery.
   - ii. Consult with First Nations on boreal caribou recovery.
   - iii. Consult with other provinces/territories to improve the understanding of boreal caribou ecology and management across Canada especially with the adjacent provinces of Ontario and Saskatchewan.
3. **Share information with the general public, interest groups, First Nations and other provinces/territories on boreal woodland caribou recovery (Objective F).**
   - i. Disseminate information on boreal caribou and their habitat and on boreal caribou recovery planning and implementation with the general public and interest groups.
   - ii. Share information with First Nations on boreal caribou recovery.
   - iii. Share information and harmonize management actions among provinces/territories, particularly where required to improve management (e.g., Ontario and Saskatchewan for trans-boundary populations).
4. **Integrate boreal woodland caribou recovery planning and management with relevant management activities (Objective F).**
   - i. Communicate with provincial/territorial resource departments, agencies and organizations responsible for land use and resource management/ conservation to ensure coordination of planning and management in or adjacent to caribou ranges.
   - ii. Identify overlapping national and provincial/territorial species at risk (e.g., wood bison) and coordinate recovery efforts where appropriate.

G. RESEARCH

1. **Conduct risk assessments for boreal woodland caribou populations, where required (Objective G).**
   - i. Where a greater understanding of the probability of local population persistence is required, conduct risk assessments such as population viability analyses for various recovery options.
   - ii. Assess the relative risk of different threats for local caribou populations particularly where this information is required to focus and enhance management.
2. **Identify and implement priority research projects for boreal woodland caribou recovery (Objective G).**
   - i. Participate in developing provincial/territorial and national priorities for boreal caribou research.
   - ii. Implement priority research projects through partnerships with various organizations and agencies.
   - iii. Ensure that research findings contribute to boreal caribou recovery through improved caribou population and habitat management, as per an adaptive management approach.

Implementation Responsibility

Manitoba Conservation is responsible for the protection and management of woodland caribou in Manitoba. The Wildlife and Ecosystem Protection Branch develops policy, management guidelines/directives and provides overall direction for boreal woodland caribou conservation and management and contributes to program implementation. The Operations Division of Manitoba Conservation contributes to the above and is responsible for program implementation. Development proposals e.g., logging, mining linear corridor development must be submitted to the Environmental Assessment and Licensing Branch of Manitoba Conservation who in turn are responsible for the evaluation of all such proposals and setting terms and conditions for each license granted including mitigation and monitoring activities.

First Nations, other jurisdictions of government, non-government organizations, industry and the general public with an interest, expertise and/or resources to devote to caribou conservation have been and are continuing to be actively involved in boreal woodland caribou conservation. The conservation needs of boreal woodland caribou on high-risk ranges will continue to be integrated into regional landscape management and sustainable development regulatory processes. The development of action plans on high-risk ranges will be the responsibility of Regional Operations, with support from the Wildlife and Ecosystem Protection Branch. Action plans, as is this Conservation and Recovery Strategy, are living documents which are intended to be responsive to new knowledge and experience in the management of boreal woodland caribou.

All land-users on caribou ranges in Manitoba, including government departments and crown corporations, share responsibility for support and commitment to the management and recovery of boreal woodland caribou in Manitoba as identified in the goals and principles of this document and in the interest of future generations of Manitobans.

Appendix 1

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The cumulative suggestions have been instrumental in providing a short and concise conservation and recovery strategy which is now available for review by others.

This strategy replaces an earlier (2000) document by Rebizant et al. entitled "Woodland Caribou (*Rangifer tarandus caribou*) Conservation Strategy for Manitoba".

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